



SEQUENCE LISTING

<110> Stamatatos, Leonidas
Barnett, Susan W.
Srivastava, Indresh K.

<120> HIV-1 VACCINES AND SCREENING METHODS
THEREFOR

<130> 2570-1-001N

<140> 09/891,609

<141> 2001-06-26

<150> 60/214,608

<151> 2000-06-27

<160> 4

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 1941

<212> DNA

<213> Human immunodeficiency virus type 1

<400> 1

| | | | | | | |
|-------------|------------|-------------|------------|------------|-------------|------|
| atgagagtga | aggggatcag | gaagaattat | cagcacttgt | ggagaggggg | caccttgctc | 60 |
| cttgggatgt | tgatgatctg | tagtgctgta | gaaaaattgt | gggtcacagt | ctattatggg | 120 |
| gtacctgtgt | ggaaagaagc | aaccaccact | ctattttgtg | catcagatgc | taaagcctat | 180 |
| gacacagagg | tacataatgt | ctgggccaca | catgcctgtg | taccacaga | ccctaaccce | 240 |
| caagaaatag | tattggaaaa | tgtgacagaa | aattttaaca | tgtggaaaaa | taacatggta | 300 |
| gaacagatgc | atgaggatat | aatcagttta | tgggatcaaa | gtctaaagcc | atgtgtaaag | 360 |
| ttaacccac | tctgtgttac | tctacattgc | actaatttga | agaatgctac | taataccaag | 420 |
| agtagtaatt | ggaaagagat | ggacagagga | gaaataaaaa | attgctcttt | caaggctcga | 480 |
| gctggaaaaat | tgataaattg | taacacctca | gtcattacac | aggcctgtcc | aaaggatatcc | 540 |
| tttgaaccaa | ttcccataca | ttattgtgcc | cgggctgggt | ttgcgattct | aaagtgtaat | 600 |
| gataagaagt | tcaatggatc | aggaccatgt | acaaatgtca | gcacagtaca | atgtacacat | 660 |
| ggaattaggc | cagtagtgct | aactcaattg | ctgttaaatg | gcagtctagc | agaagaaggg | 720 |
| gtagtaatta | gatctgaaaa | tttcacagac | aatgctaaaa | ctataatagt | acagctgaag | 780 |
| gaatctgtag | aaattaattg | tacaagacct | aacaataata | caagaaaaag | tataactata | 840 |
| ggaccgggga | gagcatttta | tgcaacagga | gacataatag | gagatataag | acaagcacat | 900 |
| tgtaacatta | gtggagaaaa | atggaataac | actttaaaac | agatagttac | aaaattacaa | 960 |
| gcacaatttg | ggaataaaac | aatagtcctt | aagcaatcct | caggagggga | cccagaaatt | 1020 |
| gtaatgcaca | gttttaattg | tggaggggaa | tttttctact | gtaattcaac | acagcttttt | 1080 |
| aatagtactt | ggaataatac | tatagggccca | aataacacta | atggaactat | cacactccca | 1140 |
| tgcagaataa | aacaaattat | aaacagggtg | caggaagtag | gaaaagcaat | gtatgcccct | 1200 |
| cccatcagag | gacaaattag | atgctcatca | aatattacag | gactgctatt | aacaagagat | 1260 |
| ggtggtaaa | agatcagtaa | caccaccgag | atcttcagac | ctggaggtgg | agatatgagg | 1320 |
| gacaattgga | gaagtgaatt | atataaatat | aaagtagtaa | aaattgagcc | attaggagta | 1380 |
| gcacccacca | aggcaaagag | aagagtgggt | cagagagaaa | aaagagcagt | gacgctagga | 1440 |
| gctatgttcc | ttgggttctt | gggagcgaca | ggaagcacta | tgggcgcacg | gtcactgacg | 1500 |
| ctgacgggtac | aggccagaca | attattgtct | ggtatagtgc | aacagcagaa | caatttgctg | 1560 |
| agagctattg | aggcgcaaca | gcatctgttg | caactcacag | tctggggcat | caagcagctc | 1620 |
| caggcaagag | tcctggctgt | ggaaagatac | ctaaaggatc | aacagctcct | agggatttgg | 1680 |
| ggttgctctg | gaaaactcat | ttgcaccact | gctgtgcctt | ggaatgctag | ttggagtaat | 1740 |

```

aaatctctgg atcagatttg gaataacatg acctggatgg agtgggagag agaaattgac 1800
aattacacaa acttaatatata caccttaatt gaagaatcgc agaaccaaca agaaaagaat 1860
gaacaagaat tattagaatt ggataagtgg gcaagtttgt ggaattgggt tgacatatca 1920
aaatggctgt ggtatataaa a 1941

```

<210> 2

<211> 646

<212> PRT

<213> Human immunodeficiency virus type 1

<400> 2

```

Met Arg Val Lys Gly Ile Arg Lys Asn Tyr Gln His Leu Trp Arg Gly
1      5      10      15
Gly Thr Leu Leu Gly Met Leu Met Ile Cys Ser Ala Val Glu Lys
20      25      30
Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr
35      40      45
Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val
50      55      60
His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65      70      75      80
Gln Glu Ile Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys
85      90      95
Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp
100     105     110
Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
115     120     125
His Cys Thr Asn Leu Lys Asn Ala Thr Asn Thr Lys Ser Ser Asn Trp
130     135     140
Lys Glu Met Asp Arg Gly Glu Ile Lys Asn Cys Ser Phe Lys Val Gly
145     150     155     160
Ala Gly Lys Leu Ile Asn Cys Asn Thr Ser Val Ile Thr Gln Ala Cys
165     170     175
Pro Lys Val Ser Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala
180     185     190
Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys Lys Phe Asn Gly Ser Gly
195     200     205
Pro Cys Thr Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Arg Pro
210     215     220
Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Glu Gly
225     230     235     240
Val Val Ile Arg Ser Glu Asn Phe Thr Asp Asn Ala Lys Thr Ile Ile
245     250     255
Val Gln Leu Lys Glu Ser Val Glu Ile Asn Cys Thr Arg Pro Asn Asn
260     265     270
Asn Thr Arg Lys Ser Ile Thr Ile Gly Pro Gly Arg Ala Phe Tyr Ala
275     280     285
Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn Ile Ser
290     295     300
Gly Glu Lys Trp Asn Asn Thr Leu Lys Gln Ile Val Thr Lys Leu Gln
305     310     315     320
Ala Gln Phe Gly Asn Lys Thr Ile Val Phe Lys Gln Ser Ser Gly Gly
325     330     335
Asp Pro Glu Ile Val Met His Ser Phe Asn Cys Gly Gly Glu Phe Phe
340     345     350
Tyr Cys Asn Ser Thr Gln Leu Phe Asn Ser Thr Trp Asn Asn Thr Ile
355     360     365

```

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Pro | Asn | Asn | Thr | Asn | Gly | Thr | Ile | Thr | Leu | Pro | Cys | Arg | Ile | Lys |
| | 370 | | | | | 375 | | | | | 380 | | | | |
| Gln | Ile | Ile | Asn | Arg | Trp | Gln | Glu | Val | Gly | Lys | Ala | Met | Tyr | Ala | Pro |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 |
| Pro | Ile | Arg | Gly | Gln | Ile | Arg | Cys | Ser | Ser | Asn | Ile | Thr | Gly | Leu | Leu |
| | | | 405 | | | | | | 410 | | | | | 415 | |
| Leu | Thr | Arg | Asp | Gly | Gly | Lys | Glu | Ile | Ser | Asn | Thr | Thr | Glu | Ile | Phe |
| | | | 420 | | | | | | 425 | | | | 430 | | |
| Arg | Pro | Gly | Gly | Gly | Asp | Met | Arg | Asp | Asn | Trp | Arg | Ser | Glu | Leu | Tyr |
| | | 435 | | | | 440 | | | | | 445 | | | | |
| Lys | Tyr | Lys | Val | Val | Lys | Ile | Glu | Pro | Leu | Gly | Val | Ala | Pro | Thr | Lys |
| | 450 | | | | | 455 | | | | | 460 | | | | |
| Ala | Lys | Arg | Arg | Val | Val | Gln | Arg | Glu | Lys | Arg | Ala | Val | Thr | Leu | Gly |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 |
| Ala | Met | Phe | Leu | Gly | Phe | Leu | Gly | Ala | Ala | Gly | Ser | Thr | Met | Gly | Ala |
| | | | 485 | | | | | | 490 | | | | | 495 | |
| Arg | Ser | Leu | Thr | Leu | Thr | Val | Gln | Ala | Arg | Gln | Leu | Leu | Ser | Gly | Ile |
| | | 500 | | | | | | 505 | | | | | 510 | | |
| Val | Gln | Gln | Gln | Asn | Asn | Leu | Leu | Arg | Ala | Ile | Glu | Ala | Gln | Gln | His |
| | | 515 | | | | | 520 | | | | | 525 | | | |
| Leu | Leu | Gln | Leu | Thr | Val | Trp | Gly | Ile | Lys | Leu | Gln | Ala | Arg | Val | Leu |
| | 530 | | | | | 535 | | | | | 540 | | | | |
| Ala | Val | Glu | Arg | Tyr | Leu | Lys | Asp | Gln | Gln | Leu | Leu | Gly | Ile | Trp | Gly |
| 545 | | | | | 550 | | | | | 555 | | | | | 560 |
| Cys | Ser | Gly | Lys | Leu | Ile | Cys | Thr | Thr | Ala | Val | Pro | Trp | Asn | Ala | Ser |
| | | | 565 | | | | | | 570 | | | | | 575 | |
| Trp | Ser | Asn | Lys | Ser | Leu | Asp | Gln | Ile | Trp | Asn | Asn | Met | Thr | Trp | Met |
| | | 580 | | | | | | 585 | | | | 590 | | | |
| Glu | Trp | Glu | Arg | Glu | Ile | Asp | Asn | Tyr | Thr | Asn | Leu | Ile | Tyr | Thr | Leu |
| | | 595 | | | | 600 | | | | | 605 | | | | |
| Ile | Glu | Glu | Ser | Gln | Asn | Gln | Gln | Glu | Lys | Asn | Glu | Gln | Glu | Leu | Leu |
| | 610 | | | | | 615 | | | | | 620 | | | | |
| Glu | Leu | Asp | Lys | Trp | Ala | Ser | Leu | Trp | Asn | Trp | Phe | Asp | Ile | Ser | Lys |
| 625 | | | | | 630 | | | | | 635 | | | | | 640 |
| Trp | Leu | Trp | Tyr | Ile | Lys | | | | | | | | | | |
| | | | | 645 | | | | | | | | | | | |

<210> 3

<211> 1860

<212> DNA

<213> Human immunodeficiency virus type 1

<400> 3

| | | | | | | |
|------------|------------|------------|------------|------------|------------|-----|
| agtgctgtag | aaaaattgtg | ggtcacagtc | tattatgggg | tacctgtgtg | gaaagaagca | 60 |
| accaccactc | tattttgtgc | atcagatgct | aaagcctatg | acacagaggt | acataatgtc | 120 |
| tgggccacac | atgcctgtgt | accacagac | cctaaccac | aagaaatagt | attggaaaat | 180 |
| gtgacagaaa | attttaacat | gtggaaaaat | aacatggtag | aacagatgca | tgaggatata | 240 |
| atcagtttat | gggatcaaag | tctaaagcca | tgtgtaaagt | taaccccact | ctgtgttact | 300 |
| ctacattgca | ctaatttgaa | gaatgctact | aataccaaga | gtagtaattg | gaaagagatg | 360 |
| gacagaggag | aaataaaaaa | ttgctctttc | aaggtcggag | ctggaaaatt | gataaattgt | 420 |
| aacacctcag | tcattacaca | ggcctgtcca | aaggtatcct | ttgaaccaat | tcccatacat | 480 |
| tattgtgccc | cggctggttt | tgcgattcta | aagtgtaatg | ataagaagtt | caatggatca | 540 |
| ggaccatgta | caaatgtcag | cacagtacaa | tgtacacatg | gaattaggcc | agtagtgtca | 600 |
| actcaattgc | tgttaaattg | cagcttagca | gaagaagggg | tagtaattag | atctgaaaat | 660 |
| ttcacagaca | atgctaaaac | tataatagta | cagctgaagg | aatctgtaga | aattaattgt | 720 |
| acaagaccta | acaataatac | aagaaaaagt | ataactatag | gaccggggag | agcattttat | 780 |

gcaacaggag acataatagg agatataaga caagcacatt gtaacattag tggagaaaaa 840
tggaaataaca ctttaaaaca gatagttaca aaattacaag cacaatttgg gaataaaaca 900
atagtcttta agcaatcctc aggaggggac ccagaaattg taatgcacag ttttaattgt 960
ggaggggaat ttttctactg taattcaaca cagcttttta atagtacttg gaataatact 1020
atagggccaa ataactacta tggaactatc aactcccat gcagaataaa acaaattata 1080
aacaggtggc aggaagtagg aaaagcaatg tatgccctc ccatcagagg acaaattaga 1140
tgctcatcaa atattacagg actgctatta acaagagatg gtggtaaaga gatcagtaac 1200
accaccgaga tcttcagacc tggaggtgga gatatgaggg acaattggag aagtgaatta 1260
tataaatata aagtagtaaa aattgagcca ttaggagtag caccaccaa ggcaaagaga 1320
agagtgggtgc agagagaaaa aagagcagtg acgctaggag ctatgttctt tgggttcttg 1380
ggagcagcag gaagcactat gggcgacgg tcaactgacgc tgacggtaca ggccagacaa 1440
ttattgtctg gtatagtgc acagcagaac aatttgctga gagctattga ggcgcaacag 1500
catctgttgc aactcacagt ctggggcatc aagcagctcc aggcaagagt cctggctgtg 1560
gaaagatacc taaaggatca acagctccta gggatttggg gttgctctgg aaaactcatt 1620
tgcaccactg ctgtgccttg gaatgctagt tggagtaata aatctctgga tcagatttgg 1680
aataacatga cctggatgga gtgggagaga gaaattgaca attacacaaa cttaataatac 1740
accttaattg aagaatcgca gaaccaacaa gaaaagaatg aacaagaatt attagaattg 1800
gataagtggg caagtttgtg gaattggttt gacatatcaa aatggctgtg gtatataaaa 1860

<210> 4
<211> 619
<212> PRT
<213> Human immunodeficiency virus type 1

<400> 4
Ser Ala Val Glu Lys Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val
1 5 10 15
Trp Lys Glu Ala Thr Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala
20 25 30
Tyr Asp Thr Glu Val His Asn Val Trp Ala Thr His Ala Cys Val Pro
35 40 45
Thr Asp Pro Asn Pro Gln Glu Ile Val Leu Glu Asn Val Thr Glu Asn
50 55 60
Phe Asn Met Trp Lys Asn Asn Met Val Glu Gln Met His Glu Asp Ile
65 70 75 80
Ile Ser Leu Trp Asp Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro
85 90 95
Leu Cys Val Thr Leu His Cys Thr Asn Leu Lys Asn Ala Thr Asn Thr
100 105 110
Lys Ser Ser Asn Trp Lys Glu Met Asp Arg Gly Glu Ile Lys Asn Cys
115 120 125
Ser Phe Lys Val Gly Ala Gly Lys Leu Ile Asn Cys Asn Thr Ser Val
130 135 140
Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile Pro Ile His
145 150 155 160
Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys Lys
165 170 175
Phe Asn Gly Ser Gly Pro Cys Thr Asn Val Ser Thr Val Gln Cys Thr
180 185 190
His Gly Ile Arg Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser
195 200 205
Leu Ala Glu Glu Gly Val Val Ile Arg Ser Glu Asn Phe Thr Asp Asn
210 215 220
Ala Lys Thr Ile Ile Val Gln Leu Lys Glu Ser Val Glu Ile Asn Cys
225 230 235 240
Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Thr Ile Gly Pro Gly

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| | | | | 245 | | | | | 250 | | | | | 255 | | |
| Arg | Ala | Phe | Tyr | Ala | Thr | Gly | Asp | Ile | Ile | Gly | Asp | Ile | Arg | Gln | Ala | |
| | | | 260 | | | | | 265 | | | | | 270 | | | |
| His | Cys | Asn | Ile | Ser | Gly | Glu | Lys | Trp | Asn | Asn | Thr | Leu | Lys | Gln | Ile | |
| | | 275 | | | | | 280 | | | | | 285 | | | | |
| Val | Thr | Lys | Leu | Gln | Ala | Gln | Phe | Gly | Asn | Lys | Thr | Ile | Val | Phe | Lys | |
| | 290 | | | | | 295 | | | | | 300 | | | | | |
| Gln | Ser | Ser | Gly | Gly | Asp | Pro | Glu | Ile | Val | Met | His | Ser | Phe | Asn | Cys | |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 | |
| Gly | Gly | Glu | Phe | Phe | Tyr | Cys | Asn | Ser | Thr | Gln | Leu | Phe | Asn | Ser | Thr | |
| | | | | 325 | | | | | 330 | | | | | 335 | | |
| Trp | Asn | Asn | Thr | Ile | Gly | Pro | Asn | Asn | Thr | Asn | Gly | Thr | Ile | Thr | Leu | |
| | | | 340 | | | | 345 | | | | | | 350 | | | |
| Pro | Cys | Arg | Ile | Lys | Gln | Ile | Ile | Asn | Arg | Trp | Gln | Glu | Val | Gly | Lys | |
| | | 355 | | | | | 360 | | | | | 365 | | | | |
| Ala | Met | Tyr | Ala | Pro | Pro | Ile | Arg | Gly | Gln | Ile | Arg | Cys | Ser | Ser | Asn | |
| | 370 | | | | | 375 | | | | | 380 | | | | | |
| Ile | Thr | Gly | Leu | Leu | Leu | Thr | Arg | Asp | Gly | Gly | Lys | Glu | Ile | Ser | Asn | |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 | |
| Thr | Thr | Glu | Ile | Phe | Arg | Pro | Gly | Gly | Gly | Asp | Met | Arg | Asp | Asn | Trp | |
| | | | | 405 | | | | | 410 | | | | | 415 | | |
| Arg | Ser | Glu | Leu | Tyr | Lys | Tyr | Lys | Val | Val | Lys | Ile | Glu | Pro | Leu | Gly | |
| | | | 420 | | | | 425 | | | | | | 430 | | | |
| Val | Ala | Pro | Thr | Lys | Ala | Lys | Arg | Arg | Val | Val | Gln | Arg | Glu | Lys | Arg | |
| | | 435 | | | | | 440 | | | | | 445 | | | | |
| Ala | Val | Thr | Leu | Gly | Ala | Met | Phe | Leu | Gly | Phe | Leu | Gly | Ala | Ala | Gly | |
| | 450 | | | | | 455 | | | | | 460 | | | | | |
| Ser | Thr | Met | Gly | Ala | Arg | Ser | Leu | Thr | Leu | Thr | Val | Gln | Ala | Arg | Gln | |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 | |
| Leu | Leu | Ser | Gly | Ile | Val | Gln | Gln | Gln | Asn | Asn | Leu | Leu | Arg | Ala | Ile | |
| | | | | 485 | | | | | 490 | | | | | 495 | | |
| Glu | Ala | Gln | Gln | His | Leu | Leu | Gln | Leu | Thr | Val | Trp | Gly | Ile | Lys | Leu | |
| | | | 500 | | | | | 505 | | | | | 510 | | | |
| Gln | Ala | Arg | Val | Leu | Ala | Val | Glu | Arg | Tyr | Leu | Lys | Asp | Gln | Gln | Leu | |
| | | 515 | | | | | 520 | | | | | 525 | | | | |
| Leu | Gly | Ile | Trp | Gly | Cys | Ser | Gly | Lys | Leu | Ile | Cys | Thr | Thr | Ala | Val | |
| | 530 | | | | | 535 | | | | | 540 | | | | | |
| Pro | Trp | Asn | Ala | Ser | Trp | Ser | Asn | Lys | Ser | Leu | Asp | Gln | Ile | Trp | Asn | |
| 545 | | | | | 550 | | | | | 555 | | | | | 560 | |
| Asn | Met | Thr | Trp | Met | Glu | Trp | Glu | Arg | Glu | Ile | Asp | Asn | Tyr | Thr | Asn | |
| | | | | 565 | | | | | 570 | | | | </ | | | |